

WHAT IS CLAIMED IS:

1. A perpendicular magnetic recording medium comprising: a nonmagnetic substrate, a first undercoating layer formed on the nonmagnetic substrate, a second undercoating layer formed on the first undercoating layer and having crystal grains and grain boundary region separating the crystal grains, and a perpendicular magnetic recording layer formed on the second undercoating layer,
wherein the first undercoating layer contains at least one of the same elements forming the crystal grains of the second undercoating layer, and the grain boundary material contains at least one of a carbide or boride as a compound.
2. A medium according to claim 1, further comprising a soft magnetic layer between the first undercoating layer and nonmagnetic substrate.
3. A medium according to claim 1, wherein the grain boundary material contains at least one compound selected from the group consisting of Al_4C_3 , HfC , Mo_2C , NbC , TaC , TiC , VC , WC , ZrC , AlB_2 , HfB_2 , MoB_2 , NbB , NbB_2 , TaB , TaB_2 , TiB_2 , VB_2 , WB , ZrB_2 , CrB , CrB_2 , CeB_6 , LaB_6 , and SmB_6 .
4. A medium according to claim 1, wherein the second undercoating layer contains 1 to 50 mol% of the compound.
5. A medium according to claim 4, wherein the

second undercoating layer contains 5 to 30 mol% of the compound.

6. A medium according to claim 1, wherein the crystal grains of the second undercoating layer have at least one of a face-centered cubic or hexagonal closest packed structure.

7. A medium according to claim 1, wherein the crystal grains of the second undercoating layer contain at least one element selected from the group consisting of Pt, Ru, Y, Pd, Re, and Rh.

8. A medium according to claim 1, wherein the first undercoating layer contains not less than 60 at% of at least one of the same elements forming the crystal grains of the second undercoating layer.

9. A medium according to claim 1, wherein the perpendicular magnetic recording layer contains Co and Pt.

10. A magnetic recording/reproducing apparatus comprising:

a perpendicular magnetic recording medium which comprises a nonmagnetic substrate, a first undercoating layer formed on the nonmagnetic substrate, a second undercoating layer formed on the first undercoating layer and having crystal grains and a grain boundary region separating the crystal grains, and a perpendicular magnetic recording layer formed on the second undercoating layer; and

a recording/reproducing head,

wherein the first undercoating layer contains at least one of the same elements forming the crystal grains of the second undercoating layer, and

5 the grain boundary material contains at least one of a carbide or boride as a compound.

11. An apparatus according to claim 10, wherein the recording/reproducing head is a single-pole recording head.

10 12. An apparatus according to claim 10, further comprising a soft magnetic layer between the first undercoating layer and nonmagnetic substrate.

13. An apparatus according to claim 10, wherein the grain boundary material contains at least one
15 compound selected from the group consisting of Al_4C_3 , HfC , Mo_2C , NbC , TaC , TiC , VC , WC , ZrC , AlB_2 , HfB_2 , MoB_2 , NbB , NbB_2 , TaB , TaB_2 , TiB_2 , VB_2 , WB , ZrB_2 , CrB , CrB_2 , CeB_6 , LaB_6 , and SmB_6 .

14. An apparatus according to claim 10, wherein
20 the second undercoating layer contains 1 to 50 mol% of the compound.

15. An apparatus according to claim 14, wherein the second undercoating layer contains 5 to 30 mol% of the compound.

25 16. An apparatus according to claim 10, wherein the crystal grains of the second undercoating layer have at least one of a face-centered cubic or

hexagonal closest packed structure.

17. An apparatus according to claim 10, wherein
the crystal grains of the second undercoating layer
contain at least one element selected from the group
5 consisting of Pt, Ru, Y, Pd, Re, and Rh.

18. An apparatus according to claim 10, wherein
the first undercoating layer contains more than 60 at%
of at least one of the same elements forming the
crystal grains of the second undercoating layer.

10 19. An apparatus according to claim 10, wherein
the perpendicular magnetic recording layer contains Co
and Pt.